

REMARKS

This Amendment is submitted in response to the Office Action dated June 8, 2007. The Office Action rejected claims 11, 13-16, 18-21 under 35 U.S.C. §103. Claim 11 is amended herein. Claim 13 has been cancelled without prejudice or disclaimer. Claims 22-24 are newly added. Applicants believe the rejections are improper or have been overcome for at least the reasons below. An Information Disclosure Statement (IDS) is submitted herewith. A Request for Continued Examination (RCE) is submitted herewith. A Petition for a One-Month Extension of Time is also submitted herewith. The Commissioner is hereby authorized to charge deposit account 02-1818 for the One-Month Extension of Time fee, the RCE fee, and for any other fees which are due and owing.

The Office Action rejects claims 11, 13-16 and 18-19 under 35 U.S.C. §103(a) as being obvious over JP 10-214682 to Tanamura et al. ("Tanamura") in view of U.S. Patent Publication No. 2001/0006827 to Yamazaki et al. ("Yamazaki"). Of these rejected claims, claim 11 is the sole independent claim. Amended claim 11 recites, at least in part, an apparatus for manufacturing an organic electroluminescence display. The organic electroluminescence display includes a substrate, a first electrode layer formed on the substrate, an organic layer including a plurality of organic material layers stacked on the first electrode layer in a predetermined pattern and a second electrode layer formed on the organic layer. The apparatus includes: a first alignment mechanism for aligning a mask, having openings corresponding to the predetermined pattern, to the substrate and for detachably attaching the mask and the substrate; a first formation unit including a plurality of vacuum processing chambers for sequentially forming the plurality of organic material layers on the substrate at a first color position, the substrate being attached to the mask; a second alignment mechanism for changing the alignment between the substrate and the mask, and for detachably attaching the substrate and the mask again; and a second formation unit including a plurality of vacuum processing chambers for sequentially forming the plurality of organic material layers on the substrate at a second color position, the substrate being attached to the mask, wherein each of the vacuum processing chamber correspond to each of the organic material layers. The second alignment mechanism is provided to connect the first formation unit and the second formation unit in series.

New dependent claim 22 recites, wherein the first and second formation units include a plurality of vacuum processing chambers for forming a hole injection layer, a hole transfer layer, and a light emitting layer on the substrate at a first color position. Also, new dependent claim 23 recites, wherein each of the hole injection layer, the hole transfer layer, and the light emitting layer is *provided with a predetermined thickness corresponding to an emitting color.*

In certain organic electroluminescence devices, it is known that the material for the light emitting layers should be provided separately because different materials are necessary for each of the different colors. However, other of the organic layers (e.g., a hole transfer layer and a hole injection layer) are provided as a common layer for each of the three RGB colors because the same material is used for all of the colors. In such a device, each common layer has a thickness that is the same for each of the RGB subpixels. Accordingly, the thickness of such common layers can not be varied for each of the RGB subpixels.

However, according to the presently claimed apparatus for manufacturing an organic electroluminescence display, certain organic layers such as a hole transfer layer and/or a hole injection layer can be separately provided for in each of the RGB subpixels. That is, in the presently claimed first formation unit, the different organic layers for a first light emitting color can be separately formed in each of the different vacuum processing chambers at a predetermined thickness by vapor depositing organic materials according to the colors of light emitted. (See also, Specification, [0052]). After the mask is realigned in the alignment chamber connecting the first formation unit to the second formation unit, the different organic layers for a second light emitting color can be separately formed in each of the different vacuum processing chambers at predetermined thicknesses, where the predetermined thicknesses of the organic layers for the second light emitting color can be different from the thicknesses of the organic layers for the first light emitting color. Therefore, according to the presently claimed method of manufacturing an organic electroluminescence display, because the thickness of the organic layers can be varied from one emitting color to another, the distance between a first electrode and a second electrode can be varied to accommodate for the different wavelengths of the emitted light.

Applicants respectfully submit that Tanamura and Yamazaki do not teach or suggest the features of the presently claimed invention, even assuming that they are properly combinable.

According to the English translation of Tanamura, the Tanamura reference generally relates to equipment and methods for manufacturing thin film light emitting devices. (See, Tanamura, [0001]). It appears from Fig. 1 of Tanamura that the apparatus includes a plurality of vacuum processing chambers 22-26, and a plurality of robotic mechanisms 22b-26b located in housings 22a-26a, where each housing is adjacent to each processing chamber 22-26. The substrate is transferred serially from chamber to chamber by the robotic mechanisms 22b-26b through connecting chambers 22c-26c.

First, Tanamura fails to disclose a first formation unit and a second formation unit, each unit including a plurality of vacuum processing chambers. Indeed, each ‘formation unit’ in Tamaqua (e.g., 22, 22a, 22b and 22c) only corresponds to or includes one processing chamber (e.g., 22).

Second, Tanamura does not disclose an alignment chamber as part of this apparatus, much less a second alignment mechanism for changing the alignment between the substrate and the mask, and for detachably attaching the substrate and the mask again, and a second formation unit including a plurality of vacuum processing chambers for sequentially forming the organic material layers on the substrate at a second color position, as recited in amended independent Claim 11. Also, Tanamura fails to disclose a second alignment mechanism that is provided to connect the first formation unit and the second formation unit in series, as recited in amended claim 11. Instead, Tanamura only discloses empty transfer chambers 22c-26c. The Office Action cites to paragraph [0071] of Tanamura for alleged support of an alignment chamber. However, this paragraph merely appears to mention that the “substrate 1 is installed on the metal mask arranged beforehand.” (See, Tanamura, [0071]). This seems to imply that whatever alignment is performed, is performed before the device enters the first chamber 21 at an aligner located elsewhere. Therefore, contrary to the presently amended claims, Tanamura does not seem to contemplate performing an alignment and/or realignment between a substrate and a mask in the context of the disclosed manufacturing apparatus.

Yamazaki is relied on for the purported teaching of an attachment fixture including a magnet plate for attaching the substrate and the mask and the mask is formed of a magnetic material. (See, Office Action, pg. 3). In addition, Yamazaki is relied on for the purported teaching that “one, two or more film formation chambers (607, 609, 611, 613) including a

plurality of vacuum processing chambers for sequentially forming the organic material layers on the substrate at one, two or more color position, the substrate being attached to the mask; wherein each of the vacuum processing chambers correspond to each of the organic material layers (Page 5, Paragraph 0063-0068) for the purpose of performing *uniform film thickness.*" (See, Office Action, pg. 3-4, emphasis added). Yamazaki appears to disclose forming or depositing the hole injection layer over the *entire surface* of the substrate, and thereafter forming the light emitting layer for the red color with a different type of shadow mask. (See, Yamazaki, [0065]). This is consistent with the description above that known methods for forming certain organic layers do not allow for varying the thickness of these layers from color to color. Therefore, because the hole injection layer is formed over the entire surface of the substrate including the areas for the red, green, and blue colors, Yamazaki is not able to control the individual thicknesses corresponding to the respective colors.

As discussed above, in the presently claimed invention, the different organic layers for the different light emitting colors can be separately formed in each of the different vacuum processing chambers of the different formation units at predetermined thicknesses, where the predetermined thicknesses of the organic layers for the second light emitting color can be different from the thicknesses of the organic layers for the first light emitting color. Yamazaki fails to disclose or suggest varying the thickness of the organic layers from one emitting color to another, and is thus unable to vary the distance between a first electrode and a second electrode to accommodate for the different wavelengths of the emitted light, as in the presently claimed invention. Therefore, Yamazaki fails to cure the deficiencies of Tanamura, as discussed above.

For at least the reasons discussed above, Yamazaki and Tanamura fail to render obvious amended independent claim 11, and claims 13-16 and 18-19 that depend therefrom, even assuming that they are properly combinable.

Accordingly, Applicants respectfully request that the 35 U.S.C. §103(a) rejection of claims 11, 13-16 and 18-19 be withdrawn.

The Office Action rejected claim 20 under 35 U.S.C. §103(a) as being unpatentable over Tanamura, in view of Yamazaki as applied to claims 11, 13-16 and 18-19 above, and further in view of U.S. Patent No. 4,917,556 to Stark et al. ("Stark"). Stark is relied on for the purported disclosure of a wafer transport and processing system that provides a first and second alignment

mechanism and are connected to the processing module in series thereby providing flow-through processing and is configured to perform the alignment changed in a vacuum atmosphere for the purpose of aligning a wafer in a given rotational direction according to a waffer flat. (See, Office Action, pg. 6). For at least the reasons given above, Stark fails to cure the deficiencies of Tanamura and Yamazaki. Moreover, Stark appears to only relate to rotational alignment of a standard circular semiconductor wafer having a flat. (See, Stark, col. 2, lines 48-54). Unlike Stark, the present claims are directed to aligning and realigning a mask relative to a substrate.

For at least the reasons discussed above, Yamazaki, Tanamura and Stark fail to render obvious claim 20, even assuming that they are properly combinable.

Accordingly, Applicants respectfully request that the 35 U.S.C. §103(a) rejection of claim 20 be withdrawn.

The Office Action rejected claim 21 under 35 U.S.C. §103(a) as being unpatentable over Tanamura in view of Yamazaki, and in view of U.S. Patent No. 5,310,410 to Begin et al. (“Begin”). Begin is relied on for the purported teaching of a “plurality of vacuum processing chambers (38, 40, 42) (Fig. 3) for sequentially forming the organic material layers on the substrate at a first color position, the substrate being attached to the mask and a second formation unit (80, 82, 84) including a plurality of vacuum processing chambers for sequentially forming the organic material layers on the substrate at a second color position.” (See, Office Action, pg. 7). Begin fails to cure the deficiencies of Tanamura and Yamazaki, as discussed above. Moreover, Applicants note that contrary to the statements of page 7 of the Office Action, Begin does not disclose forming organic materials on a substrate at a first color position or second color position in the processing chambers or transferring a substrate attached to a mask. Moreover, Begin fails to disclose an *alignment chamber* connecting a first formation unit to a second formation unit to provide for flow-through processing. The concept of flow-through processing in a controlled environment for multiple organic color layers of an EL device, where the different organic colors layers require alignments and realignments between a mask and a substrate is not fairly disclosed or suggested by the references. In the presently claimed invention, the different colored organic layers of the EL device are formed in a continuous fashion without having to expose the device to the atmosphere or having to endure increased wait times for alignments and realignments of the mask.

Applicants also respectfully maintain that Begin is not properly combinable with the remaining references in the manner suggested in the office because Begin is directed to an apparatus for processing wafers which are fabricated to provide semi-conductor chips and because Begin does not relate to processing an electroluminescent (EL) device, it would not be obvious to consider the processing chambers disclosed therein to be used to perform one or more alignment procedures between a mask and a substrate that are specifically related to processing an EL device, especially an alignment chamber connecting two separate formation units, as recited in the claims.

For at least the reasons discussed above, Tanamura, Yamazaki, and Begin fail to render obvious dependent claim 21, even assuming that they are properly combinable.

Accordingly, Applicants respectfully request the withdrawal of the 35 U.S.C. §103(a) rejection of claim 21 in view of Tanamura, Yamazaki, and Begin.

The Office Action rejected claims 11, 20 and 21 under 35 U.S.C. §103(a) as being unpatentable over Tanamura in view of U.S. Patent No. 5,695,564 to Imahashi (“Imahashi”). The Office Action appears to primarily rely on Imahashi for the purported teaching of “a first alignment mechanism (Fig. 8, U3a) for aligning a mask ... to the substrate and for detachably attaching the mask and the substrate ... and a second alignment mechanism (U3b) for changing the alignment between the substrate and the mask.” (See, Office Action, pg. 9). Tanamura and Imahashi fail to disclose or suggest all of the features of the presently claimed invention, as discussed above with respect to the rejection of Tanamura and Yamazaki.

Moreover, Imahashi relates again to semiconductor wafers and does not disclose aligning or realigning a mask relative to a substrate, especially in a unit connecting a first formation unit to a second formation unit. That is, the interconnection unit U3b in Imahashi appears to be a transfer station, rather than an alignment unit for realigning a mask to a substrate for the formation of a second light emitting color.

Accordingly, Applicants respectfully request the withdrawal of the 35 U.S.C. §103(a) rejection of claims 11, 20 and 21 in view of Tanamura and Imahashi.

New claims 22-24, which depend from claim 11 are believed to be allowable for the reasons given above and for the additional patentable elements recited therein.

The Commissioner is hereby authorized to charge deposit account 02-1818 for any fees which are due and owing.

Respectfully submitted,

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